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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,524	12/07/2001	Thomas E. Willis	884.607US1	2821

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Schwegman, Lundberg, Woessner & Kluth, P.A.
P.O. Box 2938
Minneapolis, MN 55402

EXAMINER

TUNG, KEE M

ART UNIT PAPER NUMBER

2676

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/010,524

Applicant(s)

WILLIS ET AL.

Examiner

Kee M Tung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11, 15-17 and 26-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 15-17 and 26-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed 2/28/05 has been considered in preparing this Office action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al (5,670,993 hereinafter "Greene") in view of Emerson et al (6,664,969 hereinafter "Emerson") and Larson et al (5,563,727 hereinafter "Larson").

Regarding claim 1, representative of claim 9, Greene discloses a method, comprising: detecting a write command (Col. 3, lines 31-32) to a frame buffer (display memory 24); determining a region in the frame buffer associated with a frame buffer address in the write command (Col. 5, lines 49-61); and determining whether the region is the same as a last-modified region (Col. 2, lines 2-20). (Claim 9, further) store the write command in memory associated with the graphics engine when the scan out logic accesses the associated region in the frame buffer (Col. 7, lines 59-64; receives a write command WR, Col. 3, lines 31-32). Greene discloses pixels in a row, a number or screen rows, screen memory addressing by memory row (Abstract; Col. 3, lines 1-67; Col. 6, lines 28-64) but does not disclose wherein the region spans more than one row of pixels and a shape of the region is configurable. Emerson teaches the screen (frame buffer) is

divided into a number of blocks and each block is periodically monitored for changes and the changes are transmitted to the remote console (abstract; col.2, lines 21-64 and col. 7, lines 25-39). It would have been obvious to one of ordinary skill in the art at the time the present invention was made to combine the teachings of transmitting only the modified region of the frame buffer to the display device of Emerson into the system of Greene in order to reduce power and bandwidth consumption and thus to increase the overall performance of the system. However, the combined system still fails to explicitly teach or suggest "asynchronously send the region to a display device". This is what Larson teaches (col. 11, line 65 to col. 12, line 5). It would have been obvious to one of ordinary skill in the art at the time the present invention was made to combine the teachings of Larson into the combined system of Greene and Emerson because Larson teaches the advantage of reduces the bandwidth demands on the driver circuit, and also allows regions of the image which changing rapidly to be updated more often, potentially improving the response time beyond the conventional method (col. 11, line 65 to col. 12, line 5). Therefore, at least claims 1 and 9 would have been obvious.

Regarding claim 3, Greene discloses the method of claim 1, further comprising: when the region is the same as the last-modified region, refraining from sending the region to the display device until a different region is detected (see above, Col. 4, lines 43-50).

Regarding claim 4, Greene discloses the method of claim 1, wherein the write command is issued by a graphics engine to the frame buffer (see above, Col. 7, lines 59-64).

Regarding claim 5, representative of claims 7 and 11, Greene discloses the method of claim 1, wherein the frame buffer comprises a plurality of regions each representing a

plurality of pixels on a display device, and wherein the region is one of the plurality of regions (see above, Col. 3, lines 1- 18).

Regarding claim 6, Greene discloses the method of claim 5, wherein the plurality of regions represent the plurality of pixels in a rectangular shape on the display device (see above, Figure 2, Col. 2, line 58 through Col. 3, line 7).

Regarding claim 8, Greene discloses the method of claim 4, wherein the detecting is carried out by logic connected to the frame buffer and the graphics engine (see above, row valid, comparator, Col. 3, lines 19-29).

4. Claims 2, 10, 15-17, 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al (5,670,993 hereinafter "Greene"), Emerson et al (6,664,969 hereinafter "Emerson") and Larson et al (5,563,727 hereinafter "Larson") in view of Perego (5,835,082).

The teachings of the combined system of Greene, Emerson and Larson are given in previous paragraph of this Office action. Regarding claim 2, representative of claim 10, 15-17, Greene further discloses the method of claim 1, further comprising: when the sending the region to a display device associated with the frame buffer; (Claim 10, Greene further discloses) send the write command to the frame buffer (see above); (Claim 16, Greene) addresses in the writes to region numbers (screen row information, screen r/w number, Column 3, lines 30-67); (Claim 17, Greene) instructing the scan-out logic to copy the one region from the frame buffer (screen buffer) to the display device synchronously from the writes to the frame buffer (written to ...memory or ignored, Col. 5, line 14 through Col. 6, line 27). Greene does not disclose wherein when the graphics

engine writes to the another region, the logic is to cause the one region to be written to the display device; and, regarding Claim 2, Greene does not disclose when the region is not the same as the last-modified region, and setting the last-modified region to be the region; and, regarding Claim 10, when the scan-out logic is not accessing the associated region in the frame buffer; and regarding Claim 15, causing the one region to be written to the display device. Perego teaches wherein when the graphics engine writes to the another region, the logic is to cause the one region to be written to the display device; and when the region is not the same as the last-modified region, and setting the last-modified region to be the region; when the scan out logic is not accessing the associated region in the frame buffer; causing the one region to be written to the display device. (Col. 2, lines 12-20, As new pixel data is rendered..., full frame buffer, dirty tags for the corresponding compressed data elements are set, Col. 2, lines 21-34). The motivation for combining frame buffered display and regions with writing to another region, setting the last-modified region to be the region displayed are to reduce bandwidth and power requirements (Column 2, lines 8-12, 42-53). Perego is evidence that at the time of the invention, it would have been obvious to one skilled in the art of frame buffer display to combine the benefits of using regions, write commands and memory addressing as Greene discloses, with regenerating unchanged frames without writing to the frame buffer and setting the last-modified region as the region displayed, as Perego teaches, to reduce bandwidth and power requirements.

Regarding claim 26, representative of claims 27-30, Greene discloses an electronic device, comprising: a graphics engine to, for every respective modified region in a set of

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candidate regions, copy the respective modified region from a frame buffer to a display (see above). Greene does not disclose when the respective modified region was written to during the copy, mark the respective modified region as modified, and when the respective modified region was not written to during the copy, mark the respective modified region as not modified. Perego teaches marking the modified region as not modified (tags, Column 2, lines 10-20). The motivation for combining regions with marking modified regions as not modified is to maintain memory coherency for subsequent frame updates, whereby unchanged frames are regenerated directly, thus saving power and bandwidth (col. 2, lines 7-20). Perego is evidence that at the time of the invention, it would have been obvious to combine the benefits of regions and writing to display data, as Greene discloses, with marking written modified regions as unmodified, as Perego teaches, to minimize frame changes, thus saving power and bandwidth.

Response to Arguments

5. Applicant's arguments with respect to claims 1-11, 15-17 and 26-30 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Reed et al (5,396,587) teaches an asynchronous, minimal update display system (col. 6, line 57 to col. 7, line 2).

Sugai et al (5,581,278) teaches an image display control system wherein the display clock signal and image clock signal are operated asynchronously.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kee M Tung whose telephone number is 571-272-7794. The examiner can normally be reached on Tuesday - Friday from 5:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kee M Tung
Primary Examiner
Art Unit 2676